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(54) Lavatory blocks containing active oxygen.

(57) The present invention is a solid lavatory cleansing block comprising hydrogen peroxide or a source thereof, an acid and a surfactant. Said lavatory cleansing blocks are environmentally compatible, provide improved cleansing and disinfecting as well as limescale, odour and stain removal. Additionally, the blocks of the present invention prevent the formation of limescale. Also disclosed is the possible incorporation of an enzyme into said lavatory cleansing block.

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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0961

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 184 416 (JEYES GROUP LIMITED) * page 5, line 5 - page 6, line 11 * * page 7, line 4 - line 19 * * page 9, line 14 - line 19; claims 1-9 * ---	1-13	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	26 AUGUST 1993	SIATOU E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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X	DATABASE WPI Week 8641, Derwent Publications Ltd., London, GB; AN 86-269641 & JP-A-61 197 697 (KAO CORP) 1 September 1986 * abstract *	1-13	C11D17/00 C11D3/39 C11D3/20
X Y	EP-A-0 014 979 (HENKEL KOMMANDITGESELLSCHAFT AUF AKTIEN) * page 3, line 7 - line 32; claims 1-11 *	12-13 1-11	
Y	GB-A-1 257 813 (MADISON CHEMICAL CORPORATION) * claims 1-12 *	1-11	
X Y D	EP-A-0 171 494 (WERNER & MERTZ GMBH) * page 7, line 1 - line 13; claims 1-6 * & DE-A-3 407 456	12-13 1-11	
Y	PATENT ABSTRACTS OF JAPAN vol. 13, no. 575 (C-667)19 December 1989 & JP-A-12 40 600 (SEIWA KOGYO KK) 26 September 1989 * abstract *	1-11	TECHNICAL FIELDS SEARCHED (Int. Cl.5) C11D
X,D Y	EP-A-0 234 626 (UNILEVER NV ET AL) * the whole document *	12-13 1-11	
Y	DATABASE WPI Week 9029, Derwent Publications Ltd., London, GB; AN 90-219881 & JP-A-2 147 699 (NIPPON SODA KK) 6 June 1990 * abstract *	1-11	

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& : member of the same patent family, corresponding document

13. The use of a source of active oxygen according to claim 12, wherein said source of active oxygen is selected from hydrogen peroxide or a source thereof, preformed peroxyacids, organic peroxides and mixtures thereof in a lavatory cleansing block.

EXAMPLES No. 3,4,5			
	3	4	5
Ingredients	Weight %		
Sodium Dodecyl Benzene Sulphonate	55	-	-
Lauryl Ether Sulphate	2	-	-
Sodium Coconut Alkyl Sulphate	-	50	50
Lutensol AO3O	-	5	5
Sodium Persulphate	10	-	-
Sodium Percarbonate	-	10	10
Sodium Sulphate	10	13	13
Citric Acid	15	13	13
Lipolase^{R}	3	4	2
Protease	-	-	2
Perfume	4	4	4
Dyes or pigments, water	Balance	Balance	Balance

Claims

1. A lavatory cleansing block comprising a source of active oxygen, an acid and a surfactant, whereby said lavatory block provides a permanent aqueous solution having a pH below 7 and comprising from 1ppm to 500ppm of active oxygen as said block is progressively dissolved in the lavatory bowl water.

2. A lavatory cleansing block according to claim 1, wherein said source of active oxygen is selected from hydrogen peroxide or a source thereof, preformed peroxyacids, organic peroxides and mixtures thereof.

3. A lavatory cleansing block according to claim 2, wherein said source of hydrogen peroxide is selected from percarbonates, persulphates, metal oxides and perborates.

4. A lavatory cleansing block according to claim 2, wherein said preformed peroxyacid is selected from diperoxydodecandioic acid, magnesium perphthalate, perlauric acid, perbenzoic acid, diperoxyazelaic acid and mixtures thereof.

5. A lavatory cleansing block according to claim 2, wherein said organic peroxide is selected from diacyl peroxide, dialkyl peroxide such as dibenzoyl peroxide, dilauroyl peroxide, dicumyl peroxide and mixtures thereof.

6. A lavatory cleansing block according to claims 2 and 3, further comprising from 0% to 30%, preferably from 5% to 20% of a peracid precursor.

7. A lavatory cleansing block according to claim 6, wherein said peracid precursor is selected from an ester, amide, imide and anhydride.

8. A lavatory cleansing block according to claims 1 to 7, wherein said acid is an organic acid.

9. A lavatory cleansing block according to claim 8, wherein said acid is an organic acid selected from citric, maleic, oxalic, succinic and tartaric acids and mixtures thereof.

10. A lavatory cleansing block according to claims 1 to 9, further comprising from 0% to 50% of an enzyme system.

11. A lavatory cleansing block according to claims 1 to 10, further comprising a chelant system.

12. The use of a source of active oxygen in a lavatory cleansing block to prevent limescale formation and/or remove limescale and/or remove odours and/or remove stains and/or cleanse and/or disinfect.

The differences in the composition of the in-rim and in-cistern type lavatory blocks of the present invention can be exclusively but not necessarily dependant on the type of surfactants, fillers and polymers used therein, which can determine the dissolution rate. The composition differences are well-known in the art. In-cistern type lavatory blocks can preferably contain surfactants with a lower solubilization rate and may be chosen from long chain higher anionics or nonionics with a high degree of ethoxylation. In-cistern type lavatory blocks may also contain specific ingredients to decrease the solubilization rate such as slowly dissolving polymers or oils.

The lavatory block of the present invention may also contain a number of optional ingredients. One such ingredient is a chelant system. Said chelant system improves the overall limescale/rust removal performance. Furthermore, the chelant system may improve the stability of the hydrogen peroxide in the formulation. Suitable chelants may be chosen from EDTA, NTA or preferably from biodegradable chelants such as s,s-ethylene diamino disuccinate and dipicolinic acid.

The blocks according to the present invention may further comprise from 0% to 20%, preferably 3% to 15% of an enzyme system. The enzyme system assists in the removal of faecal, urine and grease stains which are found in the lavatory bowl. Suitable enzymes that may be used herein include lipases, proteases, cellulases and amylases preferably lipases.

Further optional ingredients include perfumes and dyes used to improve the aesthetics of the lavatory block. These perfumes and dyes contained in the lavatory block are selected for their stability in the presence of sources of active oxygen. In a preferred embodiment of the present invention, where said blocks comprise a perfume and a dye, it is desirable to manufacture said blocks in a process whereby said perfumes and dyes can be premixed with the surfactants and the other optional ingredients, before the addition of the source of active oxygen.

The lavatory cleansing block is formed by conventional methods well-known in the art as described for instance in EP-A-462 643. The ingredients are mixed to form a dough of suitable consistency which can then be extruded and cut into lengths to form blocks. The extrusion process can be carried out by using simple conventional extrusion equipment such as usually used for manufacturing soap bars. Alternatively, the lavatory blocks may be prepared by compressing all of the ingredients into a block.

The present invention is further illustrated by the following examples.

Examples

The following compositions are made by premixing all of the listed ingredients in the listed proportions except the source of active oxygen which is added to the mixture just prior to the extrusion process.

EXAMPLES No. 1,2		
	1	**2**
Ingredients	Weight %	
Sodium Dodecyl Benzene Sulphonate	50	55
Lauryl Ether Sulphate	-	2
Lutensol AO3O	5	-
Sodium Persulphate	-	13
Sodium Percarbonate	14	-
Sodium Sulphate	13	10
Citric Acid	13	15
Perfume	4	4
Dyes or pigments, water	Balance	Balance

for the choice of the appropriate method are described for example in "Hydrogen Peroxide", W. C. Scumb, C. N. Satterfield and R. L. Wentworth, Reinhold Publishing Corporation, New York, 1955 and "Organic Peroxides", Daniel Swern, Editor Wiley Int. Science, 1970.

For example the active oxygen concentration according to the present invention can be determined by the iodimetric method, whereby the active oxygen solution is added to 50cc of a solution of 1% potassium iodide acidified with 1cc of 1:4 sulphuric acid, preferably in the presence of a trace of ammonium molybdate as a catalyst. After stirring and allowing to stand for 5 minutes, the iodine liberated is titrated with thiosulphate solution, with or without the use of a starch indicator.

The active oxygen concentration according to the present invention can also be determined for example by the permanganate method, whereby the active oxygen solution is acidified with sulphuric acid and titrated with a 0.1M potassium permanganate solution. The end point can be determined either visibly or potentiametrically.

The active oxygen concentration according to the present invention can also be determined for example by the cerimetric method, whereby the active oxygen solution is acidified with sulphuric acid and titrated with a 0.1M potassium permanganate solution. The end point can be determined potentiometrically or with a redox indicator such as ferrous-1,10-phenanthroline.

As used herein a hydrogen peroxide source refers to any compound which produces hydrogen peroxide when said compound is in contact with water. Suitable water-soluble sources of hydrogen peroxide for use herein include persulphates, percarbonates, metal oxides and perborates.

Suitable preformed peroxyacids for use in the lavatory blocks according to the present invention include diperoxydodecandioic acid DPDA, magnesium perphthalate, perlauric acid, perbenzoic acid, diperoxyazelaic acid and mixtures thereof. The blocks according to the present invention comprise from 0.01% to 30% of said preformed peroxyacids.

Suitable organic peroxides for use in the lavatory blocks according to the present invention include diacyl and dialkyl peroxides such as dibenzoyl peroxide, dilauroyl peroxide, dicumyl peroxide and mixtures thereof. The blocks according to the present invention comprise from 0.01% to 30% of said organic peroxides.

Optionally, the lavatory blocks may additionally comprise from 0% to 30%, preferably from 5% to 20% of peracid precursors, i.e. compounds that upon reaction with hydrogen peroxide produce peroxyacids. Examples of peracid precursors suitable for use in the present invention can be found among the classes of esters, amides, imides and anhydrides such as acetyl triethyl citrate (ATC) described for instance in EP 91 87 0207, tetra acetyl ethylene diamine (TAED), succinic or maleic anhydrides. All of these bleaching agents are environmentally compatible and odourless.

A second essential component of the blocks according to the present invention is an acid. The acid is used to ensure that the pH of the lavatory bowl water is below pH 7, preferably below pH 6.5, more preferably below pH 6. In addition some acids can have the advantage that they can form small concentrations of the corresponding peracids by reaction with hydrogen peroxide in-situ, thus enhancing the overall performance of the lavatory block. These acids can be further selected so as to have chelating and/or building properties. The acids of the present invention that may be used for these purposes can be organic or inorganic acids, preferably organic acids such as citric, maleic, oxalic succinic and tartaric acids, most preferably citric and maleic acids.

The third essential ingredient of the lavatory blocks according to the present invention is at least 10% of a surfactant. The incorporation of a surfactant increases the cleansing performance of the lavatory blocks and provides the solid matrix in which all other ingredients can be incorporated. Suitable surfactants for use herein include anionic and nonionic surfactants or mixtures thereof.

The anionic surfactants which may be used in the present invention include for example alkali metal salts of alkyl substituted benzene sulphonates, alkali metal alkyl sulphonates, alkali metal alkyl sulphates and alkali metal alkyl ether sulphates derived from for example fatty alcohols and alkyl phenols, alkali metal alkane sulphonates, alkali metal olefin sulphonates and alkali metal sulphosuccinates, whereby the sodium salts are preferred. Most preferred are sodium alkyl metal sulphonates and sulphates.

The nonionic surfactants which may be used can be chosen from any liquid or solid ethoxylated C_6-C_{24} fatty alcohol nonionic surfactant, fatty acid C_6-C_{24} alkanolamides, C_6-C_{20} polyethylglycol ethers, polyethylene glycol with molecular weight 1000 to 80000 and C_6-C_{24} amine oxides.

The lavatory blocks of the invention may further comprise 0% to 50%, preferably 5% to 30% fillers of inorganic salts such as sodium sulphate, sodium carbonate, sodium silicate and less preferably phosphorous sodium salts, for example sodium triphosphate, or inert fillers such as clay, urea or calcite. The fillers can be used to adjust the mechanistic properties of the lavatory blocks so that the active ingredients are released in the desired manner.

Field of the Invention

The present invention relates to a solid lavatory cleansing block. The blocks are environmentally safe and provide multiple benefits.

Background of the Invention

The object of the present invention is to provide an environmentally safe lavatory cleansing block for use as in-rim and in-cistern type lavatory blocks. The lavatory block should have good bactericidal activity and sanitizing and cleansing performance. Additionally, the block should provide limescale removal and improved odor and stain removal.

It has now been found that these objectives can be achieved by combining a source of active oxygen together with an acid in a solid lavatory block. Thus, as said lavatory blocks progressively dissolve in water, a permanent aqueous solution containing active oxygen and an acid is provided in the lavatory bowl.

An advantage of the present invention is that the ingredients remain permanently active in the water of the lavatory bowl in between flushes. In particular, the blocks according to the present invention thus provide the unexpected benefit that said blocks prevent the formation of limescale in said lavatory bowl.

Lavatory blocks are well known in the art. EP-A-234 626 discloses a solid lavatory cleansing block which contains an oxygen-type bleaching agent as in the present invention, but contains no acid. Similarly DE 3407 456 A1 discloses a solid bleaching block for in-cistern use. There is no acid component in this block. EP-A-462 643 discloses a rim-type solid lavatory cleansing block. The preferred water soluble bleaching agent therein is potassium dichloro cyanurate. Potassium dichloro cyanurate is not completely environmentally compatible whereas the sources of active oxygen as in the present invention are completely environmentally safe.

Summary of the Invention

The present invention is a solid lavatory cleansing block comprising a source of active oxygen, an acid and a surfactant, whereby said lavatory block provides a permanent aqueous solution having a pH below 7 and comprising from 1ppm to 500ppm active oxygen as said block is progressively dissolved in the lavatory bowl water.

All ratios, percentages and parts given herein are "by weight" unless otherwise specified.

Detailed Description of the Invention

The present invention relates to a solid lavatory cleansing block. There are two types of blocks available on the market at present, in-cistern and in-rim type lavatory blocks. The in-rim type blocks are distinct from in-cistern type blocks in that they are designed to be hung from the rim of the lavatory bowl, in a conventional type rim cage. The in-cistern type blocks are designed to be placed in the cistern itself. Depending on the positioning of the block the properties of the active ingredients will vary, depending on the length of time the block is immersed in water. The lavatory blocks of the present invention contained herein are designed to be used as both in-rim and in-cistern type lavatory blocks.

The blocks according to the present invention progressively dissolve in water, thereby releasing the ingredients in solution. Thus, a permanent aqueous solution is provided in the lavatory bowl which comprises a constant and predetermined amount of various ingredients.

The lavatory blocks of the present invention comprise as an essential feature the combination of a source of active oxygen with an acid.

The first essential component according to the present invention is a source of active oxygen selected from hydrogen peroxide or a source thereof, preformed peroxyacids, organic peroxides and mixtures thereof and provides 1ppm to 500ppm, preferably from 5ppm to 300ppm, most preferably from 10ppm to 200ppm of active oxygen in said lavatory bowl water. As used herein active oxygen concentration refers to the percentage concentration of elemental oxygen, with an oxidation number zero, that being reduced to water would be stoichiometrically equivalent to a given percentage concentration of a given peroxide compound, when the peroxide functionality of the peroxide compound is completely reduced to oxides. The available oxygen sources according to the present invention increase the ability of the lavatory blocks to remove coloured organic stains.

The concentration of available oxygen can be determined by methods known in the art, such as the iodimetric method, the permanganometric method and the cerimetric method. Said methods and the criteria